

Many old miners believe that there is a deep lead between Kumara and the Kapitea Stream. If this is the case the working of the deep ground just mentioned will probably give definite information.

The valley of the Ongionui Creek from one to three miles above Notown contains deep ground which has never been bottomed, although a shaft is said to have been sunk to a depth of 110 ft. Since a number of small streams draining into the Ongionui have been worked with highly profitable results, there can be little doubt that the ground contains gold.

Prospecting by means of the Keystone Driller or by a low-level drive from the neighbourhood of Notown may be recommended for this area.

(2.) **AURIFEROUS QUARTZ VEINS.**—Small quartz veins are found in the Greenland rocks exposed near Brunner and on the Paparoa Range. In Langdon Creek some of the veins have been worked for their gold contents, but work has been suspended for a number of years. In the larger areas of Greenland rocks immediately to the north of the subdivision there is more scope for auriferous lodes, and, as a matter of fact, two mining properties—the Blackwater and the Taffy—are now being worked in these localities with successful results.

(3.) **ANTIMONY.**—Near the head of Langdon Creek is a quartz vein about 2 ft. thick that carries a considerable percentage of antimony sulphide and oxide. Gold is also present in the stone. Many years ago this vein was worked to some extent under the name of Langdon's Antimony Mine, but is now abandoned. It appears to deserve further attention.

(4.) **COAL.**—Practically the whole of the Grey Coalfield is within the limits of the subdivision. Coal was first discovered as far back as 1847 or 1848 by Mr. Thomas Brunner, surveyor and explorer, as he was ascending the Grey River by canoe*. Coal-mining began at Brunner soon after the first gold discoveries, and has been carried on steadily ever since. The mines now operating—the State Coal Mine, the Blackball, and the Brunner—have an annual output totalling nearly 400,000 tons. Two new mines—the North Brunner and the Paparoa—have almost reached the producing stage. The total production of the field up to the end of 1908 may be estimated as 5,100,100 tons, only a small fraction of the amount yet to be mined; but since the investigation of the coal-bearing area is not yet complete no detailed estimate of the tonnage of coal still available for extraction can at present be given. North of the Grey River much of the coal is "level-free"—that is, it can be won from adits driven above drainage-level. West of Brunnerton, at Taylorville, Wallsend, and Dobson, there is a large area of proved coal-bearing country that can be worked from shafts of moderate depth. Of this area a very small portion was actually worked from the shafts of the Wallsend Mine, which was closed down many years ago. Coal probably continues westward from Dobson, but at such a depth that under present conditions it could not be profitably worked. Again, it is likely that the coal-measures continue eastward of the Brunner anticline towards the base of the Southern Alps.

In the Brunnerton district, the only part of the coalfield that has yet received detailed examination, there appears to be but one workable seam, the Brunner. Its thickness varies from 8 ft. to 20 ft., but may be said to average 14 ft. Near Mount Sewell, on the Paparoa Range, the main seam, probably a continuation of the Brunner seam, as seen in various outcrops, is under 6 ft. in thickness; but the thinning-out is merely local.

The Brunner coal is in general of excellent quality, and may be used for household, steam, or gas-making purposes. Its chief defect is its softness, which causes a large proportion to become "slack" in the processes of mining and transport.

Reference may here be made to the coal-bearing grits and mudstones seen in Kaiata, Racecourse, and Omotumotu creeks. Some thin bands of grit, consisting mainly of water-borne grains of coal, have, it would seem, been mistaken for coal-seams, and thought to be indications of thicker seams in the same beds.† Again, the water-worn fragments of coal, derived from the Miocene beds, have been considered as signs of the neighbourhood of an outcropping coal-seam. These erroneous ideas have led to some useless prospecting. The true coal-measures in these localities are some distance beneath the surface, and can be proved only by boring or shaft-sinking.

(5.) **PETROLEUM.**—The existence of petroleum in the Kotuku district has been known since 1900. In that year an exudation of oil was discovered on the bank of Petroleum Creek, near its junction with Deep Creek. Since then prospecting operations have disclosed numerous seepages of oil between this locality and Sawpit or Red Creek, about half a mile to the north. A company that was formed to develop the oilfield is said to have spent £5,000, but the only visible results of its operations are a few shallow test pits and a borehole 167 ft. deep. Since this concern failed, prospecting has been actively carried on by the Lake Brunner Oil Company and by Mr. Joseph Taylor of Greymouth. The Lake Brunner Oil Company has put down nine bores on its own property, varying in depth from 104 ft. to 821 ft. Mr. Taylor has sunk a shaft to a depth of 83 ft., and put down a number of bores, the deepest of which reached a depth of 446 ft. On his property there are also two shallow bores drilled by the Lake Brunner Oil Company under an option. With two exceptions, all these bores have been put down within or near the area in which oil-seepages occur, and all, except one, have yielded more or less oil. The exception was bored near the Kotuku Railway Station to a depth of 485 ft. without penetrating the modern gravels which here shroud the Miocene rocks. Several of the shallow wells continue to yield small quantities of petroleum with great regularity.

There can be no doubt that over a certain area the surface gravels and the upper layers of the Miocene rocks are more or less saturated with petroleum. Hence any shallow bore within this area will yield some oil and often payable or almost payable results. This very fact has, however, militated against prospecting by boring being spread over a sufficiently wide area. It so happened that the

* "Handbook of New Zealand Mines," 1887, Part I, p. 96. "Cyclopædia of New Zealand," Vol. V, 1906, p. 469.

† See McKay: "Report on Supposed Coal-seams in Kaiata Range, Greymouth," C.-10, 1907, p. 7.